Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Location-Based Routing	)	PS Docket No. 18-64
For Wireless 911 Calls	)	

COMMENTS OF WEST SAFETY SERVICES, INC.

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West Safety Services, Inc. ("West Safety")[1] respectfully submits these comments in response to the Commission's Notice of Inquiry in the above-referenced proceeding.[2]

I. INTRODUCTION

West Safety supports the Commission's efforts to explore location-based routing solutions in order to reduce the number of wireless 9-1-1 calls that must be transferred from one Public Safety Answer Point ("PSAP") to another due to misroutes.[3] Most 9-1-1 calls under the current system of tower-based routing are delivered to the appropriate PSAP in a timely manner. However, some amount of transfers between PSAPs is unavoidable even under optimal tower-based routing due to intrinsic technology limitations.

Misroutes are a frequent and especially significant issue in certain parts of the country with large population areas and/or multiple PSAPs in a single cell sector. These PSAP transfers delay dispatch, which may endanger life and property. Mitigating the misroute problem without

[1] West Safety is a wholly-owned subsidiary of West Corporation, a global provider of technology-enabled communications and network services primarily to business customers. West Safety provides emergency communications services and infrastructure systems to public safety organizations and service providers, including wireless carriers, wireline competitive local exchange carriers (CLECs), cable telephony providers and Voice over Internet Protocol (VoIP) providers.

[2] *Location-Based Routing For Wireless 911 Calls*, PS Dkt. No. 18-64, Notice of Inquiry (rel. Mar. 23, 2018) (NOI).

[3] Consistent with footnote 2 of the NOI, West Safety limits its discussion of "misroutes" to 9-1-1 calls that are received by one PSAP and then transferred to another as a result of the current 9-1-1 call routing mechanisms that rely on cell tower working as designed, not from the technical failure of those mechanisms.

relying on call holding or delay should be a central policy objective in the evolution of 9-1-1 calling and technology.

West Safety has invested a significant amount of time developing and testing location solutions that could improve the routing of wireless 9-1-1 calls in areas where tower-based routing is deficient. West Safety does not believe any of the currently deployed carrier technologies can support a viable solution for location-based routing of wireless 9-1-1 calls. Existing carrier location technologies are all network-initiated solutions that do not start the location determination process until several seconds after the caller presses send.

Recently, device-based hybrid location has emerged as a potential option for supplementing the current system of tower-based routing in known problem areas for misroutes. West Safety, as explained below, has experienced encouraging test results for handset-initiated location technologies that utilize device-based hybrid location information. Unlike network-initiated technologies, calls to 9-1-1 over these handset-initiated technologies do not have to traverse complex carrier networks or wait to reach the carrier's routing element before initiating the process for location determination. West Safety believes these handset-initiated location technologies offer promise for significantly reducing the PSAP transfer rate.

West Safety cautions the Commission, however, that carriers should maintain control over any implementations of device-based hybrid location solutions. Permitting third-party applications to deliver locations directly to PSAPs without interconnecting to the carrier's routing element should be avoided. Carriers are in the exclusive position to ensure location uniformity, security, reliability and validation under centralized Commission oversight and clear jurisdiction.

West Safety commends the Commission for evaluating this critical policy issue of misrouted wireless 9-1-1 calls caused by the technical limitations of the current system of tower-based routing. West Safety looks forward to continued discussion on wireless location capabilities and technologies, and encourages the Commission to move forward with a Notice of Propose Rulemaking (NPRM) for further consideration and comment on location-based routing.

II. DISCUSSION

A. Wireless 9-1-1 Call Misrouting and Impact to Public Safety

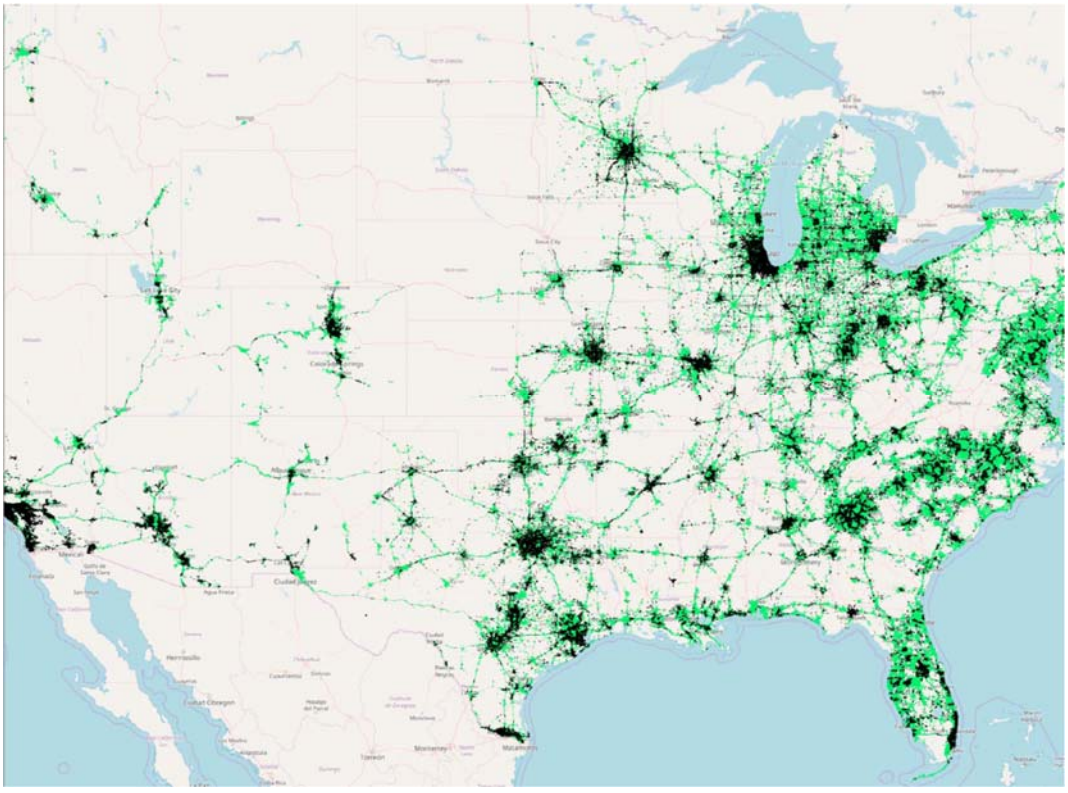
West Safety believes the current 9-1-1 system of tower-based routing is resulting in a substantial amount of misrouted wireless 9-1-1 calls. PSAP transfers can delay response to emergencies, frustrate callers and consume PSAP resources with large volumes of transfers that require the transferring agency to stay on the line until the call is answered and handed off to the receiving agency. The time wasted during PSAP transfers for wireless 9-1-1 calls has resulted in numerous documented tragedies. PSAP errors in the transfer process are common and only exacerbate life-threatening emergencies. During peak and/or stressed times like high profile events, transfers can detrimentally affect a PSAP's ability to process and prioritize incoming calls and place strain and pressure on already overextended telecommunicators.

Determining the dimensions of the misroute problem, however, can be challenging because of the multitude of data sources, cell towers, geographic regions and PSAP boundaries. Valid confidentiality and security concerns with sharing information about 9-1-1 systems, infrastructure and call records add to the challenge.

Using aggregated, post-processed data acquired from its position in the E9-1-1 ecosystem, West Safety attempted to quantify the misroute problem by evaluating routing results for 5,054,053 wireless calls to 9-1-1 covering 1,956 counties across the United States placed in

from January 1, 2018 to March 31, 2018. Only 9-1-1 calls that obtained a Phase II location with an uncertainty of 100 meters or less within 15 seconds were used in the study. The study does not fully account for all PSAP consolidations that have occurred across the country, nor does it account for calls that are transferred as a matter of course to secondary PSAPs such as state police, etc. No live 9-1-1 calls were impacted in any way by the study and all analysis was done post-processing.

West Safety compared the PSAPs that received the calls based on routing by the serving cell sector ID to the PSAPs that would have received the calls had more granular location been used for routing. The results of the study indicated that 655,299 of the total calls, or 12.96%, would have routed to a different PSAP had Phase II X/Y location been used to route the call instead of cell sector. Below is a nationwide map of the study results that shows the correctly routed calls in green and misroutes in black:



West Safety found in general that PSAPs with a higher number of total wireless 9-1-1 calls also have a higher percentage of misroutes. In addition, the percentage of misroutes was consistently higher in cell sectors with multiple PSAP boundaries. For example, in the County of Los Angeles, West Safety found that 67,149 of the 194,187 total calls to 9-1-1, or 34.58%, would have routed to a different PSAP if the Phase II X/Y location had been used to route instead of cell sector. In Palm Beach County, 6,659 of the 30,646 total calls to 9-1-1, or 21.73%, would have routed to a different PSAP if the Phase II X/Y location had been used to route instead of cell sector. These two counties are very good examples of the scale of the problem with PSAP transfers because they both are experiencing high misroute yields despite having excellent processes in place to determine the best possible routing of cell sectors to minimize misroutes.

B. Call Holding

West Safety generally does not support any form or amount of universal call holding by the mobile device before a 9-1-1 call is initiated into the wireless network. Because of differences between the 9-1-1 call delivery network and the regular voice network, the setup time for 9-1-1 calls is significantly longer than non-emergency calls and therefore a significant number of wireless callers to 9-1-1 hang-up. Wireless 9-1-1 calls typically take 10-12 seconds from when the caller presses send to when a 9-1-1 telecommunicator answers the call. Extending this already prolonged timeline by up to 5 seconds for additional call delay will further undermine the expectations of consumer for immediate emergency response, and ultimately lead to more callers prematurely terminating their calls and possibly redialing.

Furthermore, in many cases no additional delay is necessary; for example, when the cell sector falls completely within the boundaries of a PSAP, cell site location is typically sufficient

to choose the proper PSAP. Also, as smaller cells are deployed, the coverage area of these cells shrinks and they can provide a much more accurate location for routing. West Safety therefore advises against pursuing call holding as a generalized solution.

However, West Safety acknowledges that call holding may be beneficial in specific areas and population centers where misroutes are a frequent and recognized problem. Misroutes often occur when PSAP areas do not fully cover cell sector coverage areas or when PSAP boundaries are set in dense population centers. When a specific cell sector covers two or more PSAPs it is impossible to prevent misroutes from those cell sectors because cell sector location information is not sufficiently granular to ensure proper routing of the call in all cases. Misroutes in these situations could reach as high as 50% for an optimally routed cell sector.

In these unique situations where the technological limitations of tower-based routing are resulting in large percentages of misrouted calls with transfer times of over 20 seconds, minimal holding of the call by the Mobile Positioning Center (MPC)/Gateway Mobile Location Center (GMLC) may be an acceptable option. West Safety strongly recommends that the Commission limit any call holding solution to 1-3 seconds of delay. Call delay should also only be permitted (i) on cell sectors with an unavoidably high number of misroutes, (ii) when the MPC/GMLC holds a reasonable belief that it will receive location for specific 9-1-1 calls within 1-3 seconds and (iii) the PSAP believes that the benefit of reduced misroutes outweighs the downside of increased call delivery time associated with PSAP transfers.

West Safety also recommends that call delay be permitted to occur only in the MPC/GMLC because this element is responsible for routing the call and coordinating the location from all location determining elements. The call should never be delayed by the handset because the hold would affect all 9-1-1 calls, including those calls where the cell sector falls

completely within the PSAP boundaries. Finally, and most importantly, any decision to delay calls should be determined by the PSAP. The knowledge about the likelihood of misroutes and value of call delay ultimately is a PSAP decision.

C. State of Location-Based Routing Technologies

1. Current Location Technologies for 9-1-1 Routing

West Safety does not believe any of the currently deployed carrier technologies can support a viable solution for location-based routing of wireless 9-1-1 calls. All current carrier technologies for E9-1-1 Phase II location, including Assisted GPS with CDMA, AFLT with CDMA, Mobile Station Based GPS with UMTS and LTE, OTDOA with LTE and the planned technology of device-based hybrid with LTE, are network-initiated location solutions that rely on control plane location infrastructure or Secure User Plane Location (SUPL).

Network-initiated location technologies do not start the location determination process until after the call is received by the MPC/GMLC several seconds after the user dials 9-1-1. It then normally takes 9-23 seconds for network-initiated technologies to determine location, meaning a significant amount of call holding would be necessary to use this location information to route the call. Although location from existing network-initiated technologies is highly reliable and accuracy is improving with new technologies, delivery speed appears to be an insurmountable barrier for routing that is getting worse as carriers transition from 2G and 3G technologies to 4G technologies.

West Safety recently conducted a study to evaluate the location capabilities of current and future location technologies using Google's Android Emergency Location Service (ELS).[4]

[4] West Safety, *The Revolution of 9-1-1 Location Technologies: Better Location Delivered Faster* (Apr. 17, 2018), available at: https://safety.west.com/e/123032/cation-Technologies-041718-pdf/3qdfpc/1035380160 (slides) and https://www.youtube.com/watch?v=WM_X_XNwE9A (webinar recording); West Safety, *Q&A: The Revolution of*

Coordinating with several PSAPs in Florida, Georgia and Washington, West Safety implemented its test using actual 9-1-1 call data from a population of more than two million people. No live 9-1-1 calls were impacted in any way by the trial and all analysis was done post-processing. West Safety compared the existing carrier location data with the handset-initiated location information generated by ELS using Android handsets across multiple carriers primarily in Snohomish County, Washington and Palm Beach County, Florida on a total of 1,254 9-1-1 calls placed from the end of November until early January 2018.

Comparing the two datasets, West Safety was able to evaluate average time for the MPC/GMLC to receive location by technology and whether the PSAPs would have benefited from the handset-initiated ELS location in addition to the location provided by the wireless carriers. Based on the trial results, West Safety observed a median time to determine Phase II location of 9 seconds for CDMA control plane location and 23 seconds for UMTS/LTE mobile station based GPS.[5] These location delivery times, even without counting the extra 1-3 seconds of setup time for wireless 9-1-1 calls, are far outside the acceptable range for routing.

Certain other technologies and/or pre-provisioned information exist today that could provide immediate location information suitable for routing. Although these solutions have limitations that inhibit their positioning as nationwide remedies, West Safety supports their development and evaluation because they have the potential to deliver routing and location value under specific circumstances.

Wireless 9-1-1 Location Technologies (April 26, 2018), available at https://www.west.com/blog/safety-services/wireless/qa_wireless_911_location/.

[5] As discussed below, handset-initiated technologies proved to be much faster at delivering location, with Google ELS at 5 seconds median time and LaaSer/Samsung at 2 seconds median time.

a. ***Femtocell.*** A femtocell is similar to a cell site but it has a much smaller radius. Femtocells are typically installed by wireless subscribers to fill coverage holes inside homes or businesses. The radius of a femtocell is usually less than 50 meters. Femtocells typically have installed GPS devices to verify the location of the device for RF license compliance, network management and timing issues. Many carriers pre-provision dispatchable addresses for femtocells, which are validated against the X/Y from the femtocell's GPS prior to allowing any calls being made. Femtocell cell locations are available at the time routing decisions must be made for a 9-1-1 call. These locations have sufficient accuracy for routing a 9-1-1 call to the proper PSAP. Femtocell cell locations ordinarily can provide a dispatchable location and have an X/Y accuracy of less than 50 meters.

b. ***Small Cells.*** Small cells are effectively enterprise-level femtocells that are deployed and managed by the carriers, not end users. They are primarily being deployed to boost network capacity and coverage. Because small cells are being provisioned in the carriers' 9-1-1 systems in a manner similar to macro cells, systems are already in place today to provision addresses. There would need to be procedural or ALI format changes made at the PSAP so that the PSAP would know that these are dispatchable addresses originating from small indoor cells versus Phase I macrocell addresses. With proper configuration, indoor small cell locations can be used to route 9-1-1 calls and provide dispatchable addresses.

c. ***VoIP over Wi-Fi.*** Some existing VoIP over Wi-Fi solutions include a pre-provisioned address along with a handset-initiated, device-based hybrid geodetic location solution. By combining the inherent speed of crowd sourced Wi-Fi location with a proximity search of pre-provisioned address, these solutions can often provide an accurate location quickly enough to initially route a 9-1-1 call.

d. VoIP Pre-provisioned Address. VoIP pre-provisioned addresses and their geolocation are available at the time routing decisions must be made. Addresses, such as those for traditional static and nomadic VoIP devices, are provisioned by the user when they setup their service. The accuracy of these locations rely on the subscriber updating their locations if they move.

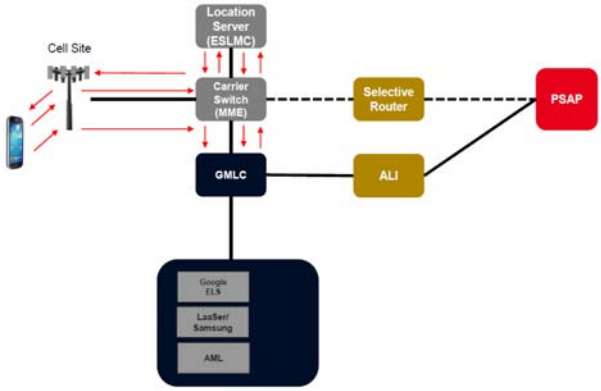
There currently is no mechanisms in place for automatically updating location for nomadic VoIP devices. Although there are mechanisms that could be used to locate these devices on broadband internet connections, deployment would require participation between the serving broadband Internet service provider (ISP) and the serving VoIP service provider (VSP) to determine the physical location of the current physical public IP address used by the VoIP subscriber. This information is known by the ISP, but is typically in separate, unconnected data stores. Systems would have to be built that would link those data stores in real-time to provide a location determination function. There also would still be issues if the VoIP connection was over a virtual private network (VPN) or if the local area network (LAN) behind the public wide area network (WAN) IP connection was geographically large and distant from the physical service address of the public IP address. This type of validated, broadband-based location technology would be most valuable in residential broadband services where static, nomadic or mobile Wi-Fi devices were placing VoIP calls over that broadband WAN. With proper configuration, this location determination technology could provide valid dispatchable locations for VoIP devices utilizing that broadband connection.

2. Emerging Handset-Initiated Location Technologies Utilizing Device-Based Hybrid Location

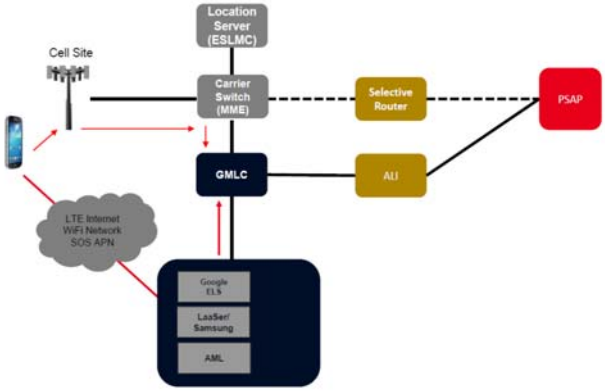
Over the past few years, handset-initiated location technologies have emerged as a potential option for location and location-based routing of 9-1-1 calls. By relying on device-

based hybrid location, handset-initiated location technologies do not have to wait for a 9-1-1 call to reach the carrier's routing element (MPC/GMLC) before initiating the process for location determination. Rather, the handset starts measuring location once it believes that the user may possibly be dialing 9-1-1 or has dialed 9-1-1, which essentially provides the phone with a head start in the location determination process. Location is then sent directly to the responsible routing element (MPC/GMLC), which saves invaluable transport time. The red arrows in the basic call diagram below are intended to illustrate the routing efficiency/time gained by shifting from network-initiated location technology to handset-initiated location technology:

Network-Initiated Location



Handset-Initiated Location

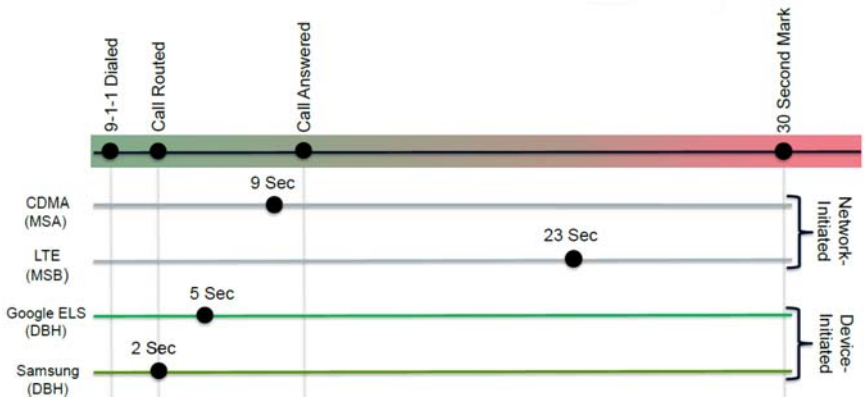


As shown, handset-initiated location technology is able to efficiently send location to the MPC/GMLC from the device. This connection can be established without any change to the carrier's existing network or a PSAP's network (including Emergency Services IP networks (ESInets)) and infrastructure. Handset-initiated location technology can also utilize multiple transport layers and provide to the MPC/GMLC any device-based hybrid locations made available to the handset (crowd sourced Wi-Fi AP locations, GPS with assistance data (mobile station-based GPS), Bluetooth Low Energy (BLE), altitude, indoor location, etc.).

West Safety is aware of at least three companies developing handset-initiated location technologies for 9-1-1 – Google (ELS/AML), LaaSer/Samsung (Advanced 9-1-1) and Apple

(AML). Of these three, West Safety has experience testing and partnering only with Google ELS and LaaSer/Samsung technologies, and is able to provide the following information:

a. Google ELS.[6] Google ELS utilizes and sends device-base hybrid location information directly from the handset to a carrier server indicated by the wireless network handling the 9-1-1 call. Upon receiving notification of 9-1-1 dialing, the Android operating system (OS) begins the location determination process. West Safety's recent study of Google ELS across multiple carriers in Snohomish County, Washington and Palm Beach County, Florida observed a median time to determine Phase II location of 5 seconds, as shown in the below comparison chart of the study results:



The delay in ELS for determining location is typically because of the finite time that is required to scan for nearby Wi-Fi access point measurements or the time for the GPS to acquire a location. If the phone has recently been using location services such as running a mapping application like Google Maps, the handset may have a current location that can be sent immediately. West Safety also observed in the ELS trial that the user terminated the call to 9-1-1

[6] *Supra* fn. 4 for additional information on Google ELS; *see* West Safety, *West Announces Results of Wireless 9-1-1 Location Trial with Google* (Mar. 6, 2018), available at https://globenewswire.com/news-release/2018/03/06/1415879/0/en/West-Announces-Results-of-Wireless-9-1-1-Location-Trial-with-Google.html; Government Technology, *Google Tests 911 Cellphone Service to Pinpoint Caller Location* (Mar. 8, 2018), available at: http://www.govtech.com/public-safety/Google-Tests-911-Cellphone-Service-to-Pinpoint-Caller-Location.html.

before it reached the MPC/GMLC or telecommunicator in about 1 in 100 calls. Nonetheless, the ELS functionality still computed the location and sent it to the server for these calls. If the user redialed 9-1-1 again immediately, that previous location was available and could be utilized to route the 9-1-1 call.

Phase II location was reported 20% of the time for network-initiated location (all GPS locations) compared to 58% of the time for ELS (10% GPS, 48% Wi-Fi).[7] For the phones that reported a Phase II location, West Safety observed initial location results based on a normalized confidence level of 90% as follows:

	Carrier			Google ELS		
	Yield	Median Time	Median uncertainty	Yield	Median time	Median uncertainty
AGPS	34%	9 sec	21 m			
GPS	49%	23 sec	15m	14%	4 sec	20 m
WiFi				76%	5 sec	34 m
Total	83%			90%		

Google ELS, in comparison to carrier technology, displayed a significant improvement in median time for Phase II location delivery with excellent uncertainty, and a higher overall amount of Phase II locations. West Safety also examined how ELS could have improved location by comparing data sets, and determined 34% of the time ELS location (7% ELS GPS, 27% Wi-Fi) provided better and faster location than the carrier's network-initiated location. In sum, handset-initiated location using ELS provided faster Phase II-capable location, significant accuracy improvements, and Phase II-capable location a majority of the time for calls where the network-initiated location only provided Cell ID.

[7] West Safety expects the yield for GPS locations to increase in the future with further refinement of ELS. It was apparent during testing that the handset process for entering emergency mode to dial 9-1-1 blocked ELS from accessing the GPS during 9-1-1 calls. With emergency mode deactivated, over 90% of the initial locations were Wi-Fi over GPS.

b. LaaSer/Samsung Advanced 9-1-1.[8] LaaSer has taken a similar approach to Google in using device-based hybrid location to send location from the handset to a centralized server associated with the originating wireless carrier. LaaSer is working with Samsung and has added functionality into the phone's native dialer to detect that a user is dialing or may be dialing 9-1-1, thereby starting the location determination process as early as possible. In testing with LaaSer and Samsung, West Safety observed that a majority of the locations arrived at the MPC/GMLC in time to route the call without any delay to the overall timeline of 10-12 seconds.

West Safety also experienced a significantly higher yield of GPS locations with LaaSer than other technologies. This was most likely because Samsung, as an Original Equipment Manufacturer (OEM), has control of the requirements of the handset modem and associated emergency modem and other related hardware and software, which places it in a unique position to optimize the speed of emergency location determination. The LaaSer location solution is also designed to immediately notify the server associated with the carrier's routing element (MPC/GMLC) that the handset includes LaaSer functionality and that location information will be arriving soon. That same information can be utilized by the carrier network to anticipate future location information.

It is likely that other OEMs and handset OS providers could provide similar capabilities to optimize the determination and delivery of handset-initiated location information. Currently,

[8] For additional information on LaaSer/Samsung's handset-initiated location technology, *see* LaaSer Critical Communications Corp., *LaaSer Critical Communications Announces Year-Long Pilot Program with Chatcomm to Demonstrate Lifesaving 911 Caller Location Technology* (June 8, 2017), available at: https://www.laaser911.com/news/laaser-critical-communications-announces-year-long-pilot-program-with-chatcomm-to-demonstrate-lifesaving-911-caller-location-technology/; LaaSer Critical Communications Corp., *LaaSer Critical Communications Announces Strategic Alliance with West* (Aug. 9, 2016), available at: https://www.prnewswire.com/news-releases/laaser-critical-communications-announces-strategic-alliance-with-west-300311159.html.

the Google ELS and Samsung/LaaSer solutions utilize proprietary communications between the handset and the carrier-side server. The carrier-side server then connects into the existing E9-1-1 wireless network utilizing standards-based protocols. This method provides tremendous advantages by allowing the OEMs and handset OS providers to innovate and improve their individual solutions while still delivering location results over a standards-based interface with the 9-1-1 network.[9]

In addition to potentially providing an option for wireless 9-1-1 routing, handset-initiated location technologies have the capacity to enhance routing and location for VoIP services. As VoIP services migrate to mobile devices and utilize Wi-Fi, VoIP begins to look a lot like traditional wireless calls over cell phones that include location capabilities ingrained in the device, such as device-based hybrid and GPS. Location services for VoIP on mobile devices are currently in production with the ability to validate pre-provisioned address immediately at the time of the call against the X/Y on the device. Because of the global nature of VoIP Wi-Fi calls and the requirement to route to the proper PSAP, some VoWiFI devices obtain location before the call to 9-1-1 can even be attempted. Additionally, some implementations of VoWiFI devices have an X/Y sufficient to route the call to the proper PSAP. Many of these devices can also deliver a validated dispatchable location.

D. Implementation of Handset-Initiated Location Technologies Utilizing Device-Based Hybrid Location

Carrier control, uniform location quality and simplicity and PSAP operational consistency are critical aspects for the safe implementation of handset-initiated location technologies utilizing device-based hybrid location. Although third-party applications exist that

[9] It is important in the future to preserve the current flexibility in development by not standardizing the interface from the handset to the carrier-side server. Only the interface from the carrier-side server to the carrier's routing element (MPC/GMLC) should be standardized.

could enable handsets to deliver location directly to PSAPs, West Safety believes the best interest for public safety is to require location technologies to interconnect to the carrier routing element before delivery to the PSAP. Considering wireless carriers are the primary party responsible for routing 9-1-1 calls, they should also have the appropriate level of control and responsibility for uniform delivery of location information. Moreover, allocating location and routing control to the carriers will ensure that the Commission has streamlined and clear jurisdiction over 9-1-1 security, reliability and effectiveness.

Additionally, carriers are in the distinct position to implement consistent procedures for the validation and format of location information delivered by handsets. The goal of location delivery should be to provide accurate and simplified location information to PSAPs as quickly as possible using single best location through a controlled and secure carrier connection. Implementation of new location solutions should allow for consistency within the PSAP community with minimal operational impact.

Carriers have the ability to employ proximity checks to ensure delivery of the most appropriate location to the PSAP by comparing pre-provisioned address information to the device X/Y. The security of carrier networks also affords increased assurance against the spoofing of location information. Furthermore, 9-1-1 routing and location has proven to be most reliable and enhanced when device and network technologies are joined to achieve a robust and secure platform.

West Safety therefore recommends the Commission restrict third-party applications from providing wireless 9-1-1 location information or routing solutions without carrier interconnection and oversight over device-based hybrid location information. In addition, device-based hybrid

locations should only be provided by OS and OEM providers because they have a uniquely better understanding of the carrier ecosystem than third-party application companies.[10]

E. Next Generation 9-1-1 Capabilities for Location-Based Routing

Next Generation 9-1-1 (NG9-1-1) networks and ESInets are not designed to assist with the generation of location information for routing 9-1-1 calls. These technologies should be thought of as consumers of location data. One of the core functions built into an NG9-1-1 ESInet is routing. For an ESInet to function correctly in end-to-end NG9-1-1, location information must be available at the time of routing. For all NG9-1-1 calls, the first step is to obtain a location sufficient to select the correct ESInet or PSAP for routing.

ESInets in NG9-1-1 are meant to utilize detailed location information for specific, dynamic routing. Examples of such dynamic routing include special events, disasters or other situations where PSAPs would prefer calls within a defined area be routed to a different PSAP or mobile command point or to specific telecommunicators. These special ESInet features are supported by providing more granular and accurate location information, which means improvements in location would provide greater value to PSAPs and encourage their transition to NG9-1-1. ESInets can also greatly benefit from faster location and the ability of NG9-1-1 networks to push (rather than query) handset-initiated location more efficiently to the PSAP.

One important issue to note for NG9-1-1 is there may be temptation to delay calls to enable location-based routing by taking advantage of the overall reduction in time to answer 9-1-1 calls in end-to-end NG9-1-1. As the industry moves to i3 networks, the current 10-12 second delivery time to the PSAP will shrink significantly under the simplified network architecture for

[10] *See* The Wall Street Journal, *Google Tests System to Help Locate 911 Callers* (Feb. 15, 2018) (noting AT&T's discovery of Google's undisclosed testing of ELS with RapidSOS, a third-party application provider, after the test impacted data provisioning for 50,000 live 9-1-1 calls), available at: https://www.wsj.com/articles/google-tests-system-to-help-locate-911-callers-1518712754.

NG9-1-1. This time reduction may be used to justify delaying calls until receiving location for routing provided the total answer time remains 10-12 seconds. West Safety recommends the Commission avoid 9-1-1 call delay at all costs in policy advancement and implementation of location-based routing technologies. Because callers expect immediate response, the policy objective should be to curtail hang-ups as much as possible by encouraging carriers and PSAPs to reduce the overall timeline of 10-12 seconds to answer.

III. CONCLUSION

West Safety appreciates the opportunity to provide these comments and respectfully requests that the Commission proceed with a NPRM for further evaluation of the important policy issue of location-based routing for wireless 9-1-1 calls.

Dated: May 7, 2018 Respectfully submitted,

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